Find the limit algebraically

① $\lim_{x \to 4} \frac{2x-8}{\sqrt{x}-2}\left(\frac{\sqrt{x}+2}{\sqrt{x}+2}\right)$

$$\frac{(2x-8)(\sqrt{x}+2)}{x-4}$$

$$\frac{2(x-4)(\sqrt{x}+2)}{x-4}$$

$$2(\sqrt{x}+2)$$

$$2(\sqrt{4}+2)$$

$$2(2+2)$$

$$2(4)$$

$$8$$

② $\lim_{x \to 0} \frac{\sin 2x}{4x} = \sin 2x \cdot \frac{1}{4x}$

$$\sin 2x \cdot \frac{1}{2x} \cdot \frac{1}{2}$$

$$\lim_{x \to 0} \frac{\sin 2x}{2x} \cdot \frac{1}{2}$$

$$1 \cdot \frac{1}{2} = \frac{1}{2}$$

3.2

(18) $f(x) = 4x - x^2$

at $x = 3$

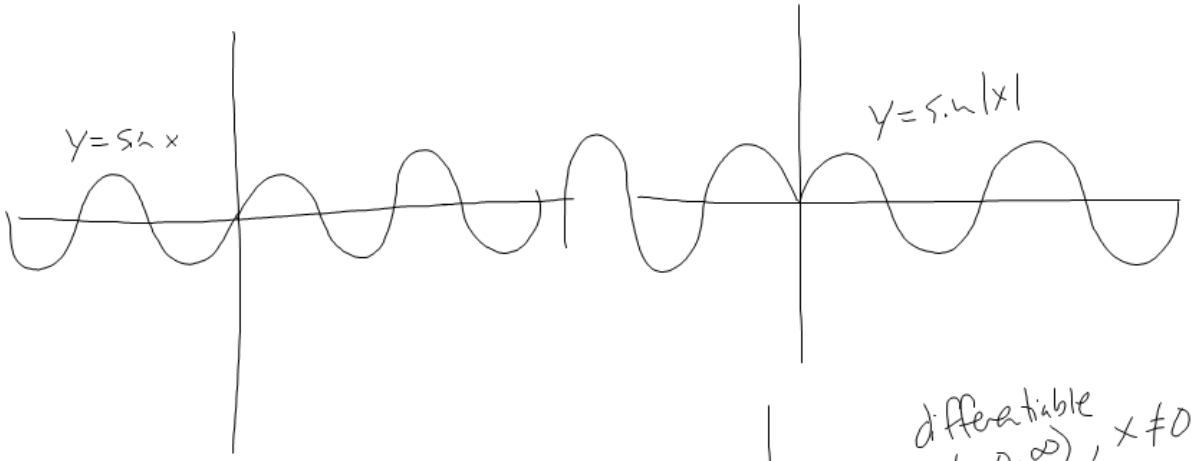
$h = 0.001$

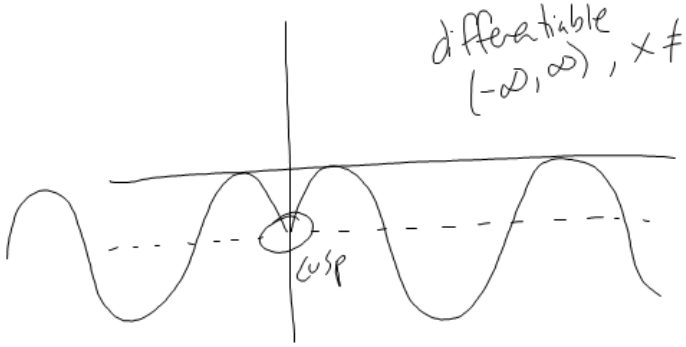
$$\Rightarrow \frac{f(x+h) - f(x-h)}{2h}$$

$$\frac{4(3.001) - (3.001)^2 - \left(4(2.999) - (2.999)^2\right)}{0.002} = -2$$

yes
it is
differentiable

(33) $\sin(|x|) - 1$



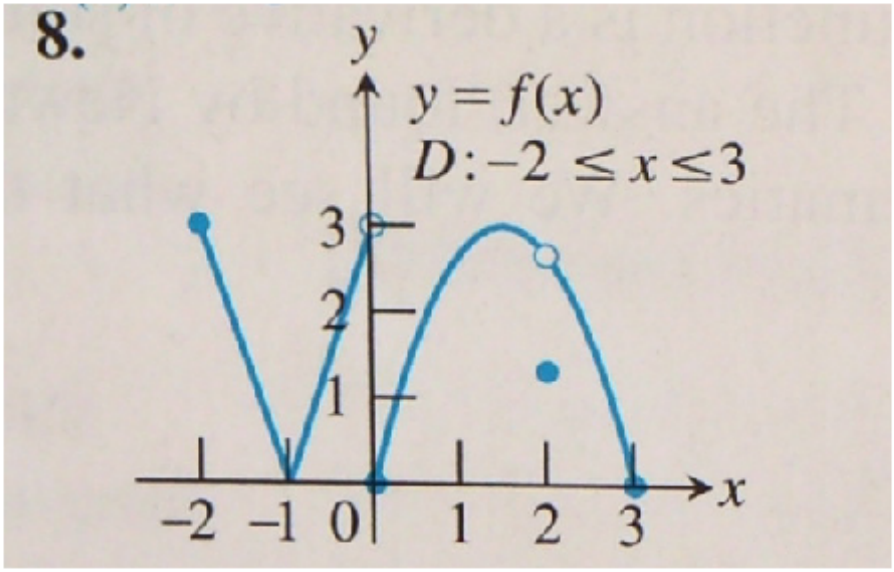


differentiable
$(-\infty, \infty)$, $x \neq 0$

3.2

(8)

8.



(a) differentiable

$[-2, 3]$, $x \neq 0, -1, 2$

(b) continuous but not diff.

$x = -1$

(c) Not cont. nor diff

$x = 0, 2$

39 a

$$f(x)=\begin{cases}3-x & , \ x<1\\ ax^2+bx & , \ x\geq 1\end{cases}$$

$3-(1)=2$ $\quad 2=a(1)^2+b(1)$

$2=a+b$

39 b.

$f'(ax^2+bx)=-1$

$a2x+b=-1$

$a+b=2$

$a2x+1=-b$

$a-2=-b$

$a2x+1=a-2$

$a+1=a-2$

$a+1=-2$

$a=-3$

$b=5$

Sect. 3.1

#6, 12, 24, 27, 29 (only do ± data pts.), 31, 44

Sect. 3.2

#3, Graph derivative #5–10